



University of Bahrain
College of Information Technology
Department of Computer Engineering

Computer Networks
ITCE 315

B

ITCE 315: Computer Networking

Midterm Exam II
Date: Sun 7.12.2014
Duration: 60 minutes
Instructor: Dr. Alaudin Al-Omary

SID:

Name:

Question	Marks	Marks obtained
1	10	7
2	28	27.5
3	24	19
4	18	16
Total	80	69.5

v.good

Q1. Choose the most suitable answer from the following [5Marks, 1/2 Mark each]:

- 1) Which one of the following is cookies privacy?
 - a. cookies permit sites to learn a lot about you
 - ☒ b. cookies file kept on user's host, managed by user's browser
 - c. cookie file kept on user's host, managed by user's browser
 - d. none of the above
- 2) For client-server model, which of the following is true for the clients? Choose many answer if any
 - a. Always have permanent IP address
 - b. May be intermittently connected
 - ☒ c. May have dynamic IP addresses
 - d. Do not communicate directly with each other
- 3) A process sends/receives messages to/from
 - a. Application layer
 - ☒ b. Socket
 - c. TCP
 - d. UDP
- 4) For non-persistent HTTP, the total response time is
 - a. $2RTT + 2$ transmit time
 - b. $1RTT +$ transmit time
 - ☒ c. $2RTT +$ transmit time
 - d. $1RTT + 2$ transmit time
- 5) Socket has:
 - ☒ a. Port number of the process only
 - b. IP address associated with a process only
 - c. Port number and IP address associated with a process
 - d. None of the above
- 6) Which of the following is a transport service needed by an application
 - a. minimum throughput guarantees,
 - b. Data loss consideration
 - ☒ c. Routing
 - d. Security
- 7) Which of the following is NOT true for STMP?
 - a. P2P protocol
 - b. Client server protocol
 - c. Connection oriented protocol
 - ☒ d. Need Centralized server

- 8) _____ uses two separate ports for control connection and data connection
- HTTP
 - SMTP
 - POP3
 - FTP**

- 9) Which of the following is NOT true for classless address block?
- The addresses in a block must be contiguous, one after another.
 - The number of addresses in a block must be a power of 2 (1, 2, 4, ...)
 - The first address must be evenly divisible by the number of addresses.
 - None of the above**

- 10) Classful addressing use:
- divide the address into 6 categories.
 - divide the address into 5 categories.**
 - divide the address into 4 categories.
 - does not divide them into categories

27-5

- Q2) Answer the following questions: {28 marks}
- If we want to access 7 Objects using http protocol, compare between Persistent and nonpersistent http [4 Marks]

	Nonpersistent http	Persistent http
No of connection	parallel tcp connection for every object 7 connections $\times 2 = 14$ connections <small>2 RTT</small>	only one connection for all the objects They will be subsequent 1 connection
Response time	Response time = $2RTT + \text{transmit time}$ one RTT for TCP connection and one for transferring the first bytes of msg	Response time = $RTT + \text{transmit time}$ x7

3.5

- Explain what is meant by elastic applications. [2 Marks]
elastic application make use of only throughput they got. **2**
- give example of two elastic applications [2 Marks]
mail, torrent **2**
- What is the mail transfer protocol used in the Internet? What are the possible mail access protocols used between the receiver's mail server and the user agent? What are the protocols used between the sender's mail server and the sender? [4 Marks]

The mail transfer protocol used in the Internet: SMTP

Simple mail transfer protocol

What are the possible mail access protocols used between the receiver's mail server and the user agent?

POP3 : Post office Protocol Version 3 , IMAP : Internet mail access protocol

HTTP : Hyper Text transfer protocol

What are the protocols used between the sender's mail server and the sender? SMTP : Simple mail transfer protocol

e. Compare between TCP and UDP protocol services [6 marks]

	TCP	UDP
What is provided	reliable data transfer, flow control, congestion control	faster transferring (connectionless) (no handshaking) ^{of files because its}
What is not provided	minimum throughput guarantees, timing, security	No reliable data transfer, no flow control, no time security - throughput guarantees.
Connection	connection-oriented setup, it needs a setup (handshaking) between client, server	connection less, No handshaking

f. Describe how Web caching can reduce the delay in receiving a requested object. Will Web caching reduce the delay for all objects requested by a user or for only some of the objects? Why? [4 Marks]

- When a client request a file, it request the proxy server (cache) and if proxy have it then it sends it directly to client, if not then it request the origin server and when it receive it sends a copy of it to client and keep a copy in its storage. So next time a client request it, proxy server will send it directly. It will reduce the delay of all objects because it reduces the traffic on the access link.

g. Consider an e-commerce site (e.g., Amazon.com) that wants to keep a purchase record for each of its customers. Describe how this can be done with cookies? [2 Marks]

- The cookies keeps a virtual cart for the customer in its backend data base of website server.
- cookies file must be kept in user host organized by user browser and it needs the cookie header line for request msg and header line for response msg.

h. What is the purpose of using cookies [4 Marks]

- If a site doesn't want to hassle a user every time to enter his password and ID, so it uses cookies so that the user do the authentication only the first time and then uses the cookies to log in.
- to keep track of client preference, so that the server gives the client the contents as a function of his identity, and provide advertisements based on his preferences.

Q3) Answer the following questions:

- a- II. What is the address space in each of the following systems?
A system with 16-bit addresses

address space = $2^n = 2^{16} = 65536$

- b- An address space has a total of 256 addresses. How many bits are needed to represent an address?

To represent any address we need 32 bits

- c- Change the following IP addresses from dotted-decimal notation to binary notation.

- a. 190.34.16.108

$10111110 = 00100010 = 00010000 = 10110100$

- b. 170.14.36.89

$10101010 = 00001110 = 00100100 = 01011001$

- d- Change the following IP addresses from binary notation to dotted-decimal notation.

01101011/11110110/01100111/01010101

107.246.103.85

- e- In a block of addresses, we know the IP address of one host is 190.40.82.16/25. 32 - 25 = 7

- 1- What is the first address (network address) in this block?

190.40.82.16/25

- 2- What is the last address in this block?

190.40.82.127/25

- 3- How many hosts are in this block?

$2^{32-25} = 128 - 2 = 126$

∴ 126 hosts are in this block

- f- Write the following masks in slash notation (/n).

- a. 255.255.0.0

/16

- b. 255.255.255.0

/24

190.60.16.0/23

512
addresses

Q4) An ISP is granted a block of addresses starting with 190.60.16.0/23. The ISP wants to distribute these blocks to 8 organizations with 4 organizations receiving just 16 addresses and another 4 receive 32 addresses.

1- Design the subblocks and give the start and last address for each block and slash notation for each subblock.

- The mask for the organizations with 16 addresses:

$$2^{32-n} = 16$$

$$2^{32-n} = 2^4$$

$$32-n=4$$

$$n=28$$

∴ The mask is /28

ICDR

• 28 bit network

• 4 bit host

- The mask for the organizations with 32 addresses:

$$2^{32-n} = 32$$

$$2^{32-n} = 2^5$$

$$32-n=5$$

$$n=27$$

∴ The mask is /27

• 27 bit network

• 5 bit host

<p>First subblock</p> <p>Start address: 190.60.16.0 /28</p> <p>Last address: 190.60.16.15 /28</p>	<p>2nd subblock</p> <p>Start address: 190.60.16.16 /28</p> <p>Last address: 190.60.16.31 /28</p>	<p>3rd subblock</p> <p>Start address: 190.60.16.32 /28</p> <p>Last address: 190.60.16.47 /28</p>	<p>4th subblock</p> <p>Start address: 190.60.16.48 /28</p> <p>Last address: 190.60.16.63 /28</p>
<p>5th subblock</p> <p>Start address: 190.60.16.64 /27</p> <p>Last address: 190.60.16.95 /27</p>	<p>6th subblock</p> <p>Start: 190.60.16.96 /27</p> <p>Last: 190.60.16.127 /27</p>	<p>7th</p> <p>Start: 190.60.16.128 /27</p> <p>Last: 190.60.16.159 /27</p>	<p>8th</p> <p>Start address: 190.60.16.160 /27</p> <p>Last address: 190.60.16.191 /27</p>

2- Find out how many addresses are still available after these allocations.

$$\text{All addresses} = 2^{32-23} = 512 \text{ addresses}$$

$$\begin{aligned} \text{No. of addresses used} &= (4 \times 16) + (4 \times 32) \\ &= 64 + 128 \\ &= 192 \end{aligned}$$

$$\therefore \text{The number of addresses available} = 512 - 192 = 320 \text{ addresses}$$

00000000 1st
00001111

00010000 2nd
00011111

00100000
00101111

00110000 4th
00111111

01000000
01011111